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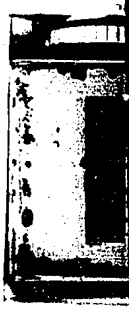
CLASSIFICATION S-E-C-R-E-T
SECURITY INFORMATION
CENTRAL INTELLIGENCE AGENCY
INFORMATION FROM
FOREIGN DOCUMENTS OR RADIO BROADCASTS

REPORT
CD NO.

50X1-HUM

COUNTRY USSR
SUBJECT Scientific - Chemistry, therapeutics; Medicine, infectious diseases
HOW PUBLISHED Biweekly newspaper
WHERE PUBLISHED Moscow
DATE PUBLISHED 13 Mar 1952
LANGUAGE Russian

DATE OF INFORMATION 1952
DATE DIST. 16 Apr 1952
NO. OF PAGES 2
SUPPLEMENT TO REPORT NO.



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## USSR RESEARCH ON FURACYLIN AND ITS APPLICATIONS

Prof S. Giller, Laureate Stalin Prize,
Corr Mem Acad Sci Latvian SSR
Prof A. Iepukali, Riga

Since 1947, the Academy of Sciences Latvian SSR has worked on the clinical application of nitrofuranes. About [illegible] compounds of this class were synthesized in the course of that work and new methods for the preparation of nitrofurane derivatives developed. In the beginning of 1948, the valuable properties of furacylin (synthesized by S. Giller and E Gudriniyetse) were established. Furacylin has an extensive range of action on both gram-positive and gram-negative bacteria. It has a bacteriostatic effect at concentrations of 1:100,000 to 1:200,000 and a bactericidal effect at higher concentrations, acting on all species of streptococci and staphylococci, intestinal and typhoid bacteria, gonococci, Flexner's dysenteria, brucella, bacteria causing gas gangrene, etc. Prof I. I. Kazanskiy and V. F. Novinskaya of Moscow found that furacylin also has a strong trypanocidal action Furthermore, the effectiveness of this drug in the treatment of coccidioses of animals and of various virus infections was noted.

An investigation of the enzymotoxic properties of furacylin disclosed its selective action on enzymes which are present both in the macroorganism and the bacterial cell. In therapeutic concentrations (1:4,200), furacylin does not suppress the physiological activity of the majority of enzymes, encountered in the living organism. An exception are dehydrogenases, which, even at high dilutions of furacylin, lose their capacity to participate in oxidation-reduction processes. Dehydrogenases participate in the metabolism of pyruvic acid. i. e., aid in the process of carbohydrate metabolism. It is possible that this specific activity of nitrofuranes endows them with the ability to suppress the growth of bacteria.

Furacylin acts selectively on enzymes, i. e., substances which are very sensitive to the action of chemical agents. Consequently, it is not very toxic. This conclusion has been confirmed by pharmacological data and clinical observations.



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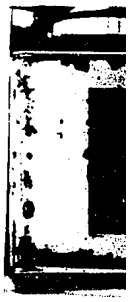

In 1950, the Pharmacological Committee /Ministry of Public Health/ of the USSR admitted furacylin to general use for external application. In the same year, the Riga Pharmaceutical Plant No 3 started production of this drug.

In 1951, the Academy of Sciences Latvian SSR held a meeting at Riga, in the course of which an audience of 400 physicians and scientists. In a report by Prof A. Kalnyn'sh, Acting Member, Academy of Sciences Latvian SSR, and S. Giller, the connection between the chemical constitution of nitrofuranes and their physiological activity was clarified. These authors also pointed out that substances of this class affect enzymatic oxidation-reduction processes of macroorganisms as well as of microorganisms. However, macroorganisms have many ways of compensating this harmful effect, so that the toxicity of these substances to higher organisms is negligible.

S. P. Zayeva, Doctor of Medical Science (Institute of Experimental Medicine, Academy of Sciences Latvian SSR), reported that nitrofuranes (including furacylin), as distinguished from sulfonamides, preserve their effectiveness in the presence of paraaminobenzoic acid. This property permits the use in surgery of furacylin solutions combined with novocain, which is of great practical importance. Zayeva further stated that parentheral administration of furacylin has no appreciable influence on the morphological indexes of peripheral blood or the resistance of erythrocytes.

Prof A. F. Lepukali, chief of the Hospital Surgical Clinic, Riga Medical Institute, and Prof F. I. Stradyn', Corresponding Member, Academy of Sciences USSR, presented data obtained by observing 5,000 instances of the clinical application of furacylin. For therapeutic purposes, they use a 1:5,000 solution of furacylin or an ointment having a 1:500 concentration of furacylin. In otolaryngological practice, a 1: 1,500 solution in 70% alcohol is occasionally used.

A study of reactions of the organism to parentheral administration of a furacylin solution showed that this drug stimulates phagocytosis considerably and raises the phagocytary capacity of the macroorganism. Externally, furacylin is used for the initial treatment of wounds, in cases of burns, carbuncles, phlegmous, osteomyelitis, suppurative pleuritis, and suppurative processes of various localization. The application of furacylin, as well as of any other chemotherapeutic agent, cannot replace surgery, of course. On the other hand, prophylactic use of furacylin together with novocain, in connection with major operations in the abdominal and thoracic regions, contributes to a lowering of lethality and of the rate of post-operative complications.

Furacylin has the following valuable properties: capacity to stimulate phagocytosis, lack of inhibiting effects as far as maintenance of the composition of the blood and hemopoiesis are concerned, absence of hemolysis, lack of harmful effects on the urinary secretion system, capacity to expedite granulation and the healing of wounds.

At present, surgical clinics of the Latvian SSR use furacylin extensively. A report presented by Dr F. Niburg at the meeting mentioned above states that excellent results were obtained with this cheap and highly effective drug under the conditions of medical practice in villages. According to data reported by V. Ferber, furacylin was also found very useful and effective for ophthalmological applications.

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